AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A programming device comprising:

a group of program generation tools to generate programs for each of a plurality of devices forming part of a control system that controls a group of external machines; and

a data sharing unit adapted to interface with said group of program generation tools to share a variable name and attribute data definitions corresponding to an object of each of said plurality of devices,

wherein the objects are shared by said program generation tools for generating the programs by transferring the variable name and the attribute data definitions corresponding to the object into each respective program generation tool that shares the object and wherein the plurality of devices includes at least two devices selected from a group of: a display device displaying status of each of the machines, a system supervision device detecting an abnormal condition of a production line comprising the group of machines, and a programmable controller for controlling one or more of the machines.

2. (previously presented): The programming device according to claim 1, wherein programming action in one of the program generation tools relating to an object acts as a trigger

to store a setting of the object to the data sharing unit together with an indication of the program

generation tools which reference said object, and

the sharing of said object with program generation tools other than said one of the

program generation tools comprises notifying the program generation tools, other than said one

of the program generation tools which reference said object, of said object.

3. (previously presented): The programming device according to claim 1, further

comprising an object data definition unit adapted to perform data definition and data

modification of the objects shared in the data sharing unit,

wherein all objects involved in the object sharing are centrally managed.

4. (previously presented): The programming device according to claim 1, further

comprising:

a system configuration tool, being registered with a subset of said objects, said subset of

said objects being basic type objects having a high frequency of use in the devices in the control

system, the system configuration tool being adapted to select an object from the basic type

objects for use in the control system.

5. (currently amended): A programming device comprising a group of program

generation tools for generating programs for each of a plurality of devices forming part of a

control system that controls a group of machines,

wherein one of the program generation tools performs data definition of a variable name

and attribute data corresponding to an object in each of said devices forming part of the control

system for controlling the group of machines, and

wherein the variable name and attribute data corresponding to said object are stored for

use by program generation tools other than said one of the program generation tools, and

wherein the plurality of devices includes at least two devices selected from a group of: a

display device displaying status of each of the machines, a system supervision device detecting

an abnormal condition of a production line comprising the group of machines, and a

programmable controller for controlling one or more of the machines,

wherein the object is shared by said program generation tools for generating the programs

by transferring the variable name and the attribute data definitions corresponding to the object

into each respective program generation tool that shares the object.

6. (currently amended): The programming device according to claim 5, wherein

information about whether or not the object is referenced by program generation tools other than

said one of the program generation tools is registered, and

wherein any program generation tools, other than said one of the program generation

tools which reference the object,is- are notified of the object.

7. (previously presented): The programming device according to claim 6, further

comprising a detection unit adapted to detect any overlap between a referenced part of the object

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and other stored objects when a program is generated by the program generation tools other than

said one of the program generation tools.

8. (previously presented): The programming device according to claim 6, wherein when

an object referenced by a first program generation tool from the group of program generation

tools is changed by a second program generation tool from the group of program generation

tools, the first program generation tool is notified of the changed object.

9. (previously presented): The programming device according to claim 6, wherein the

object is stored to a storage area for subsequent retrieval by the other program generation tools

which reference the object when they are started.

10. (currently amended): A programming method for generating programs for devices

forming part of a control system that controls a group of machines, the method comprising:

according to a pre-designed virtual object, defining an object name and attribute data

corresponding to an object of each of the devices forming part of the control system to control

the group of machines, specifying a device that will use the object, and registering information

about the object and the specified device in a data sharing unit;

notifying, of each object, a program generation tool for the specified device that will use

the object; and

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according to the objects registered in the data sharing unit, performing programming of

the devices by the notified program generation tools, and

wherein the plurality of devices includes at least two devices selected from a group of: a

display device displaying status of each of the machines, a system supervision device detecting

an abnormal condition of a production line comprising the group of machines, and a

programmable controller for controlling one or more of the machines,

wherein the object is shared by said program generation tools for generating the programs

by transferring the variable name and the attribute data definitions corresponding to the object

into each respective program generation tool that shares the object.

11. (previously presented): The programming device according to claim 1, wherein the

plurality of devices comprise:

the display device displaying the status of each of the machines;

the system supervision device detecting the abnormal condition of the production line

comprising the group of machines; and

a programmable controller for controlling one or more of the machines.

12. and 13. (canceled).

14. (currently amended): The programming device according to claim 1, wherein the

group of program generation tools comprises at least two out of a group of: a display program

generation tool, a control program generation tool, a communication program generation tool,

and a system supervision program generation tool and wherein the data sharing unit is adapted to

download the same object name and the same object attributes to every program generation tool

that shares the object and wherein, when the object name and the object attributes are

downloaded into one of the program generation tools, access to the object name and the object

attribute data is allowed for other program generation tools.

15. (previously presented): The programming device according to claim 14, wherein for

each object of each of said plurality devices, the data sharing unit stores the variable name, the

attribute data definitions, and a list of devices, from the plurality of devices forming part of the

control system, that refer to the object.

16. (currently amended): The programming device according to claim 15, wherein the

data sharing unit stores a-an object managing table comprising the variable name, the attribute

data definitions, the list of devices, and an update status, for each object of each of said plurality

devices, and wherein the update status indicates whether or not the corresponding object has

been updated.

17. (previously presented): The programming device according to claim 16, wherein,

when the corresponding object has been updated, the data sharing unit accesses the list of devices

for the corresponding object and notifies the program generation tools for each of the devices on

the list.